



Breakout Session II: Predictive Oncology Algorithms and Software – Challenges, Opportunities and Paths Forward

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Current Resources

1. ITCR
2. Data Commons
3. CANDLE
4. QIN (quantitative imaging network)
5. Dockstore.org – genomic related containers
 1. Workflow containers
6. Openslide
7. TCIA
8. NCI cloud resources
9. List of medical imaging resources
10. Other open domain Machine Learning tools / frameworks

Key Opportunities

1. Maintain a curated list of available tools
 - (as currently done by ITCR)
 - What's the incentive to participate: Publication required as term of grant
2. Leverage DOE non-cancer tools
 - system biology, CFD and other scaled code from national labs
3. Tie tool development to clinical outcomes
 1. Bring tools into clinical workflow
4. Improve Standards
5. Improve quality and awareness of workflows already available in the cloud
6. Map hospital EMR data into a standard form to facilitate input into CANDLE
 1. Can we use ML to control variability in hospital specific implementations
7. Move from desktop to cloud based tools
8. Reference/Benchmark datasets
9. Can we generate enough synthetic data to use for training
10. Quality assurance, scalability, supportability of the tools
 - Need a standards body



Challenges and Roadblocks

1. Have to put tools into clinical workflows to validate them
 - This does not necessarily mean clinical trials
 - Start with quality settings?
2. Clarify what CANDLER can be leveraged to help parallel the clinical process/workflow
 - What can and cannot be ingested from EMRs
3. Interoperability is the key challenge
4. Transitioning informatics into something clearly actionable
5. Improving digital literacy of physicians – Usability of tools for physicians
6. Visualization
7. Data assurance, validation and views
8. What is sharable? When? How do we best manage?
9. Managing X-domain collaborations
 1. Role of tools
 2. Impact/convergence for tools
10. Still constrained by access to data
11. Access to computational power required to train algorithms



Next Steps

1. Improve participation from EMR players
2. Ensure expertise in:
 1. Complex software systems and integrations
3. Clarify and communicate TCIA
4. Clarify and communicate Cancer Cloud Resources
5. Clarify and communicate availability of Data Commons
6. Improve V&V of software
7. Broad teams of pathologists – and EMR Vendor players